

Report distributed by the Defense Technical Information Center, optionally in view of Japanese Reference No. 4-323294. The Examiner stated that the *Technical Report* teaches fluoroiodoalkanes as fire-extinguishing agents and fire-suppression agents and directly suggests binary mixtures of halogenated carbons and halogenated hydrocarbons including binary mixtures where fluoroiodoalkane is one of the components. The Examiner referred to pages 39-43 and 62 of the *Technical Report*. The Examiner asserted that because the *Technical Report* speaks of binary mixtures having a boiling point and not a boiling range, the *Technical Report* implies that azeotropic blends or near azeotropic blends are contemplated. The Examiner relied on the Japanese reference as disclosing that trifluoriodomethane evinces flame extinguishing properties and can be used in admixtures with R-143A, R-152A or R-161 to form an admixture that is non-flammable.

However, as will be set forth in detail below, it is submitted that the Japanese reference is not proper prior art with respect to the present application and that the presently claimed methods are non-obvious over and patentably distinguishable from the *Technical Report*. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Initially, Applicants submit that the Japanese Reference No. 4-323924 is not proper prior with respect to the present application, whereby the portion of the rejection under 35 USC §103 based on the Japanese reference should be withdrawn.

More particularly, the Japanese reference has been applied under 35 U.S.C. 103 in view of its publication date of November 12, 1992. To remove the Japanese reference as prior art with respect to the present application, submitted herewith is a copy of a Declaration under 37 C.F.R. 1.131 made by the co-inventors, Dr. Jonathan S. Nimitz and Lance H. Lankford, previously filed in parent application Serial No. 08/027,227, of which the present application is a divisional. The Declaration demonstrates the conception of the present invention by Dr. Nimitz and Mr. Lankford prior to November 12, 1992 and the exercise of due diligence by Dr. Nimitz and Mr. Lankford from a time prior to November 12, 1992 to the filing of the parent application on March 5, 1993. The Declaration under 37 C.F.R. 1.131 further demonstrates that the conception and exercise of due diligence by Dr. Nimitz and Mr. Lankford was in the United States. Specifically, Exhibit A included with the Declaration evidences the conception of the invention prior to November 12, 1992, while Exhibits B-J evidence the due diligence exercised by Dr. Nimitz and Mr. Lankford in the preparation of

their patent application. In the parent application, the Examiner held that the Declaration obviated the rejections in the parent application based on the Japanese reference. Similarly, in the present application, the Declaration obviates the rejection based on the Japanese reference, and in accordance with the provisions of 37 C.F.R. 1.131, the Japanese reference "shall not bar the grant of a patent" to the present inventors. Accordingly, that portion of the rejection under 35 U.S.C. §103 based on Japanese Reference No. 4-323294 should be withdrawn. Reconsideration is respectfully requested.

Moreover, Applicants submit that the methods of using a fire-extinguishing agent as defined by independent claims 157, 169, 170 and 177, and the claims dependent thereon, are non-obvious over and patentably distinguishable from the *Technical Report*. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

As defined by claims 157 and 169, the methods according to the present invention comprise providing a fire-extinguishing agent consisting essentially of an azeotropic or near azeotropic blend of fluoroiodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers, in a discharge apparatus, and discharging a fire-extinguishing amount of the agent from the discharge apparatus into contact with a combustible or flammable material. According to claims 170 and 177, the methods comprise providing a fire-extinguishing agent comprising a blend of a fluoroiodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers, in a discharge apparatus, and discharging a fire-extinguishing amount of the agent from the discharge apparatus into contact with a combustible or flammable material. Claims 169 and 177 further specify a group of compounds from which the fluoroiodocarbon component of the blend is selected.

As set forth in the present specification, for example at page 17, lines 15-32, the methods of the present invention are advantageous in that they employ effective fire-extinguishing agents which are non-ozone-depleting. The methods of claims 157 and 169, and the claims dependent thereon, are further advantageous in that use of azeotropic and near azeotropic blends permit simplified handling of the fire-extinguishing agent employed in the claimed methods and the agent does not fractionate into separate components over time.

The *Technical Report* describes a study, research and investigation for the development of a fire-extinguishing agent with fire-fighting characteristics equal to or

superior to methyl bromide (page 1, Abstract). Numerous halogenated compounds were evaluated including, inter alia, several fluoroiodocarbon compounds. However, Applicants find no teaching or suggestion in the *Technical Report* relating to mixtures of fluoroiodocarbon compounds with one or more hydrofluorocarbons, perfluorocarbons or fluoroethers.

In the Official Action, page 4, the Examiner states:

On pages 39-43, and 62 the reference directly suggests binary mixtures of halogenated carbons and halogenated hydrocarbons including binary mixtures where fluoroiodoalkane is one of the components.

However, contrary to the Examiner's assertions, Applicants find no teaching in the *Technical Report* relating to binary mixtures where a fluoroiodoalkane is one of the components.

Specifically, at pages 39-43, the binary mixtures which are discussed are mixtures of ethyl bromide and methyl iodine, ethyl bromide and methylene chloride, and carbon tetrachloride and trichloroethylene. Table VI at page 43 discloses binary mixtures of CH_2Br_2 and each of CBr_3F , $\text{C}_6\text{F}_{11}\text{C}_2\text{F}_5$, $\text{CH}_3\text{CH}_2\text{Br}$, CCl_4 and CHCl_3 . No binary mixtures containing a fluoroiodoalkane are found. At page 62, Table VII, the *Technical Report* discloses binary mixtures of CH_3Br and SF_6 , CH_3Br and C_4F_{10} , CH_3Br and $\text{C}_2\text{H}_5\text{Br}$, CH_3I and $\text{C}_2\text{H}_5\text{Br}$, CH_2Cl_2 and $\text{C}_2\text{H}_5\text{Br}$, CClF_3 and $\text{C}_2\text{H}_5\text{Br}$, and CCl_4 and $\text{CCl}_2=\text{CClH}$. Again, no binary mixtures containing a fluoroiodoalkane compound are found in Table VII at page 62.

Not only do Applicants find no teaching or suggestion in the *Technical Report* relating to any binary mixtures containing fluoroiodocarbon compounds, particularly in combination with a hydrofluorocarbon, a perfluorocarbon or a fluoroether as required by the present claims, the *Technical Report* specifically states in the paragraph bridging pages 2 and 3:

Several binary mixtures of halogen compounds were used as fire retarding agents on mixtures of N-pentane and air. This preliminary study indicated that in certain instances the use of a mixture of halogen-containing compounds is advantageous. The actual effectiveness appeared to be characteristic of the particular mixture used. Hence, no generalizations can be made regarding choice of constituents in the mixture.

Additionally, with respect to the specific binary mixtures set forth in Table VII at page 62, some of the mixtures are disclosed as providing improved fire-extinguishing effects while some of the mixtures are disclosed as providing inferior fire-extinguishing properties. Thus, the *Technical Report* provides no overall motivation for successful combination of any of the single compounds disclosed therein. Specifically, Applicants find no teaching or suggestion in the *Technical Report* as to whether or not any improvement would be provided by use of fire-extinguishing agents comprising the blends which are presently claimed.

In the Official Action, the Examiner acknowledges that while the *Technical Report* does state that “no generalizations can be made regarding the choice of the constituents in the mixture”, the Examiner asserts that such is not deemed to teach away from the presently claimed invention. However, in order for the presently claimed methods to be patentable, it is not necessary that Applicants demonstrate that the prior art teaches away from the claimed invention. Rather, in order for the Examiner to establish nonpatentability of the present methods, the Examiner has the burden to show that the asserted modification of the prior art is suggested as desirable by the prior art. In view of the *Technical Report*’s conclusion that no generalizations could be made regarding choice of constituents in binary mixtures, the *Technical Report* does not suggest any desirability for providing the specific blends employed in the present methods, namely fluoriodocarbons and at least one hydrofluorocarbon, perfluorocarbon or fluoroether. Thus, the Examiner has not met the burden of establishing the prima facie case of obviousness based on the *Technical Report*.

It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art, *In re Wesslau*, 147 USPQ 391 (CCPA 1965). Thus, it is impermissible to rely on the specific binary mixtures taught in the *Technical Report* in order to conclude that the *Technical Report* renders obvious the presently claimed methods, while ignoring the conclusion of the *Technical Report* itself that no generalizations can be made with respect to the choice of constituents in a fire-fighting mixture. Rather, when the *Technical Report* is viewed in its entirety, it is clear that the *Technical Report* does not teach or suggest to one of ordinary skill in the art the blends employed in the present claims or any

desirability with respect to use of the blend compositions as recited in the present claims for firefighting purposes.

When a selective combination of prior art teachings is necessary to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself; not only must the claimed invention be evaluated as a whole, but so also must the references so that their teachings are applied in the context of the significance to a technician at the time of the invention, *Interconnect Planning Corp. v. Feil*, 222 USPQ 543 (Fed. Cir. 1985). As noted above, the *Technical Report* provides no guidance for the combination of the fluoroiodocarbon compound and at least one of a hydrofluorocarbon, a perfluorocarbon and a fluoroether. Rather, the *Technical Report* discloses only a few specific binary mixtures and concludes that no generalization concerning the effectiveness of binary mixtures can be made from the limited investigations conducted by the authors.

Also in the Official Action, the Examiner relies on *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980) for the proposition that it is not patentable to employ two or more materials in combination for the same purpose for which they are taught to be individually useful. However, the Examiner's reliance on *In re Kerkhoven* is inappropriate in the present application where the prior art teaches that the effectiveness of binary mixtures is unpredictable in view of the respective properties of the individual materials. Where the prior art specifically teaches that some mixtures exhibit improvement while other mixtures exhibit a decrease in performance, as the results in Table VII at pages 62-63 of the *Technical Report* indicate, *In re Kerkhoven* is not applicable.

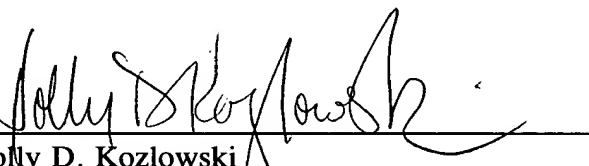
Finally, the Examiner states that Applicants have not shown superior or expected results for their particular fire-extinguishing admixtures over those directly taught by the *Technical Report*. However, a showing of unexpected results is not necessary where the Examiner has not established a prima facie case of nonobviousness. As noted above, in the absence of any suggestion in the prior art relating to the specific blends recited in the claims or relating to a desirability of the presently claimed blends for use in fire-fighting, the Examiner has not established a prima facie case of obviousness with respect to the presently claimed methods employing such blends for fire extinguishing or fire suppressing purposes.

At most, in view of the teachings set forth in the 332 pages of the *Technical Report*, one skilled in the art might find it obvious to try various combinations of the numerous compounds disclosed therein. However, "obvious to try" is not the standard for negating patentability under 35 U.S.C. §103, *In re Geiger*, 2 USPQ 2d 1276 (Fed. Cir. 1987); *In re O'Farrell*, 7 USPQ 2d 1673 (Fed. Cir. 1988). Particularly, the *Technical Report* provides no suggestion that blends of a fluoriodocarbon compound, particularly with at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers as presently claimed, are suitable for use as fire extinguishing agents in fire extinguishing or fire suppression methods as now claimed.

In view of these deficiencies in the teachings of the *Technical Report*, and in view of the withdrawal of the Japanese reference as prior art with respect to the present application, it is believed that the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

It is believed that the above represents a complete response to the rejections set forth in the Official Action, and places the present application in condition for allowance. Reconsideration and an early allowance are requested.

Respectfully submitted,

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Docket No. 10807-002

PATENT**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

Applicant: Nimitz, et al. : Paper No.:
Serial No.: 08/027,227 : Group Art Unit: 1208
Filed: March 5, 1993 : Examiner: J. Anthony

For: **FLUOROIODOCARBON BLENDS AS CFC AND HALON REPLACEMENTS****DECLARATION UNDER 37 C.F.R. 1.131**

Box Amendment
ASSISTANT COMMISSIONER OF PATENTS
Washington, D.C. 20231

Sir:

Dr. Jonathan S. Nimitz and Lance H. Lankford declare that:

1. They are co-inventors of the present U.S. Application Serial No. 08/027,227 filed March 5, 1993 and entitled FLUOROIODOCARBON BLENDS AS CFC AND HALON REPLACEMENTS.

2. They conceived of the invention set forth and claimed in the present application prior to November 12, 1992 and exercised due diligence from prior to November 12, 1992 to the filing of the present application on March 5, 1993. Their conception, exercise of diligence and filing of the present application occurred in the United States.

3. As evidence of the conception of the invention in this country prior to November 12, 1992, submitted herewith is a copy of a draft patent application which they prepared prior to

November 12, 1992, marked Exhibit A. Although the date has been removed from Exhibit A, they verify that the date on Exhibit A is prior to November 12, 1992.

4. As evidence of their exercise of diligence from prior to November 12, 1992 to the filing of the present application on March 5, 1993, submitted herewith as Exhibits B-G are copies of Dr. Nimitz's phone records evidencing continued discussions between Dr. Nimitz and Mr. Lankford through out the period from prior to November 12, 1992 to March 5, 1993. Their continued discussions are evidenced by the calls placed by Dr. Nimitz to Mr. Lankford at (916) 643-5880, Sacramento, California and at (916) 663-1083, South Placer, California. They verify that these discussions evidenced by Exhibits B-G related to their preparation of a patent application directed to the present invention for filing in the U.S. Patent and Trademark Office, which resulted in the filing of the present patent application on March 5, 1993. As further evidence of their diligence in the period prior to November 12, 1992 to March 5, 1993, submitted herewith as Exhibits H-J are copies of statements from Montgomery and Andrews, Albuquerque, New Mexico, the law firm which assisted Dr. Nimitz and Mr. Lankford in the preparation of their U.S. Patent Application which resulted in the filing of the present application on March 5, 1993. Exhibits H-J evidence continued diligent activity on behalf of Dr. Nimitz and Mr. Lankford by their attorneys at Montgomery and Andrews in the preparation of the present application, and included a review of possible rights to the present invention of Mr. Lankford's employer, The United States Air Force.


Dr. Jonathan S. Nimitz and Lance H. Lankford further declare that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of

Title 18 of the United States Code, and that such wilful false statements may jeopardize the validity of the application, or any patent issuing thereon.

Respectfully submitted,

Jonathan S. Nimitz

Date: _____


Lance H. Lankford

Date: 15 NOV 95

Title 18 of the United States Code, and that such wilful false statements may jeopardize the validity of the application, or any patent issuing thereon.

Respectfully submitted,

Jonathan S. Nimitz
Jonathan S. Nimitz

Date: Nov. 17, 1995

Lance H. Lankford

Date: _____

EXHIBITS

- Exhibit A:** Draft Application (15 pages)
- Exhibit B:** Nimitz Phone Record - 10/25/92 (1 page)
- Exhibit C:** Nimitz Phone Record - 10/25/92 (1 page)
- Exhibit D:** Nimitz Phone Record - 01/25/93 (1 page)
- Exhibit E:** Nimitz Phone Record - 01/25/93 (1 page)
- Exhibit F:** Nimitz Phone Record - 02/25/93 (1 page)
- Exhibit G:** Nimitz Phone Record - 03/25/93 (1 page)
- Exhibit H:** Montgomery & Andrews Bill - 02/05/93 (3 pages)
- Exhibit I:** Montgomery & Andrews Bill - 03/11/93 (4 pages)
- Exhibit J:** Montgomery & Andrews Bill - 04/16/93 (3 pages)

(fluoriod.pat)

10807-002

CLEAN, EFFECTIVE, NONTOXIC, NONFLAMMABLE,
ENVIRONMENTALLY FRIENDLY
REFRIGERANTS, FOAM BLOWING AGENTS, AND SOLVENTS

5

Abstract of the Disclosure

10 A set of effective, environmentally benign refrigerants, foam blowing agents, ^{Propellants} and solvents is disclosed. The agents are characterized by high efficiency for refrigeration, foam blowing, and solvent cleaning plus nonflammability, low toxicity, short atmospheric lifetimes, and low ozone depletion and global warming potentials. The agents are one- to eight-carbon haloalkanes containing fluorine and either one iodine atom or two geminal bromine atoms and a hydrogen atom, ^{SOME} APPLICATIONS INCLUDING MIXTURES WITH HYDROCARBONS AND/OR $CF_4 \rightarrow C_6F_{14}$.

Canoe,
Please review + mark up extensively
T. H. H. H.
Jon

CLEAN, EFFECTIVE, NONTOXIC, NONFLAMMABLE,
ENVIRONMENTALLY FRIENDLY
REFRIGERANTS, FOAM BLOWING AGENTS, AND SOLVENTS

Background of the Invention

5 1. Field of the Invention.

The invention described and claimed herein is generally related to refrigerants, foam blowing agents, and solvents and more particularly, to refrigerants, foam blowing agents, and solvents that are nonflammable, nontoxic, and are destroyed rapidly by natural processes in the troposphere, and thus have
10 short atmospheric lifetimes and very low ozone depletion potentials (ODPs) and global warming potentials (GWPs, also called greenhouse potentials). Although it is relatively easy to identify chemicals that satisfy one or two of these criteria, finding chemicals that satisfy all of these criteria requires considerable effort.

15 2. Background.

The refrigerants, foam blowing agents, and solvents currently in use include chlorofluorocarbons (CFCs) such as CFC-11, CFC-12, CFC-113, CFC-114, CFC-115, and blends thereof such as R-500 and R-502. These chemical compounds contain chlorine, fluorine, and carbon. Because of their great chemical stability,
20 when released to the atmosphere, only a small fraction of these chemicals is

destroyed by natural processes in the troposphere. As a result, they have long atmospheric lifetimes and migrate to the stratosphere where they undergo photolysis, forming chlorine radicals that seriously deplete the earth's protective ozone layer. Each chemical is assigned an ozone-depletion potential (ODP) that reflects its ability to destroy stratospheric ozone. The ozone depletion potential is reported in each case relative to CFC-11 (CFCl_3 , or trichlorofluoromethane), which has been assigned a value of 1.0. Currently used CFCs have ODPs near 1. Selected properties of commonly used CFCs are shown in Table I.

TABLE I. CFCs IN CURRENT USE AS REFRIGERANTS, FOAM BLOWING AGENTS, AND SOLVENTS.

Name	Formula	CFC No.	CAS No.	BP(°C)	ODP	^{ORAL.} * Rat 4-hr LC ₅₀ , %	CAS
trichlorofluoromethane	CCl_3F	11		23.9	1	2.64	75-69-4
dichlorodifluoromethane	CCl_2F_2	12		-30.8	1	UNKNOWN	75-71-8
1,1,2-trichloro-1,2,2-trifluoroethane	$\text{CCl}_2\text{FCClF}_2$	113		48	1	4.3	76-13-1
1,2-dichloro-1,1,2,2-tetrafluoroethane	$\text{CClF}_2\text{CClF}_2$	114		3.5		UNKNOWN	76-14-2
chloropentafluoroethane	CClF_2CF_3	115					
-	-	500		-33	.8	>50%	75-45-6
-	-	502		-46		UNKNOWN	76-15-3

- a. azeotrope of CClF_2 (73.8 wt. %) and CHF_2CF_3 (26.2 wt. %).
 b. azeotrope of CClF_2CF_3 (51.2 wt. %) and CHClF_2 (48.8 wt. %).

UNKNOWN SINCE SUBSTANCE BOILS AT A VERY LOW TEMP & WOULD EXPLODE THE RAT LIKE AN OVERFILLED BALLOON.

The three major mechanisms for destruction of halocarbons in the troposphere are photolysis, attack by hydroxyl radical (OH), and attack by oxygen atoms (O). In the troposphere the sunlight present is of longer wavelength (and correspondingly lower energy) than the light present in the stratosphere. If

5 molecules are to be photolysed in the troposphere they must contain light-absorbing groups and weak bonds. Such light-absorbing groups with weak bonds include carbon-to-iodine single (sigma) bonds and geminal dibromide groups.

The broad class of halocarbons consists of all molecules containing carbon and one or more of the following halogen atoms: fluorine, chlorine, bromine, or

10 iodine. Halocarbons may also contain hydrogen atoms, carbon-to-carbon multiple bonds, or aromatic rings. Haloalkenes are a subset of halocarbons and contain a carbon-to-carbon double bond plus at least one halogen atom. Iodoalkanes contain a carbon-to-iodine bond and have no carbon-to-carbon multiple bonds.

The saturated hydrocarbons from the which fluoroiodocarbons are derived,

15 for example methane and ethane, are generally volatile and highly flammable gases at room temperature. Substitution of halogens for the hydrogen atoms in such hydrocarbon compounds reduces both the volatility and the flammability of the compounds. Sufficient substitution of halogen atoms for hydrogen results in nonflammable liquids and gases which are useful as refrigerants and solvents,

FOAM BLOWING AGENTS
& PROPPELLANTS.

Some general observations can be made regarding the relative effects of halogenation of the lower alkanes. Generally, for example, increasing iodine substitution results in increasing boiling point and flame extinguishment properties. Fluorine substitution has much less effect on boiling point, but results in lower toxicity than bromine. Chlorine substitution is intermediate between fluorine and bromine in its effects.

[discuss use of hydrocarbons cfc's, hfc's, hcfc's as refrigerants, foam blowing agents, and solvents] *see ATCHD PGS 1-3*

A refrigerant operates by absorbing heat as it evaporates in one region of the apparatus, then gives up the heat as it recondenses in another portion of the apparatus. Hydrocarbons including propane, butane, and isobutane have been used as refrigerants. However, these chemicals are highly flammable. By addition of 5-40% by weight of an appropriate fluoroiodoalkane the fluid is made a more efficient heat-transfer fluid and is rendered self-extinguishing. Such mixtures are unique non-flammable hydrocarbon blends. Because refrigeration equipment requires lubricant circulating in the refrigerant fluid, miscibility of agents with lubricants is necessary. All agents and blends show miscibility with the two major groups of lubricants: mineral oil and polyalkylene glycols (PAGs). A further advantage is that leak detection is greatly simplified compared to CFCs or HFCs because hydrocarbons are much easier to detect. The agents and blends shown in Table satisfy the requirements for refrigerants:



NEED TO RUN EQUILIBRIUM CALCS

GUESSES
CFC.

R-12

R-22

ALT.

PURE CF_3I

OR 5-10% CF_3I + 95% N-BUTANE

PROPANE + 15-30% CF_3I (AZEOTROPE)

[fill in]

A foam blowing agent must create uniform, controllable cell size in a polymer matrix, and preferably should provide high insulation value and be non-flammable.

- 5 The following pure agents and blends are proposed as foam blowing agents:

CF₃I

[fill in] CF₃I + ALIPHATIC NAPHTHA

Miscibility → Higher BP. CF-I (N.BP ~ 15-20°C) + HYDROCARBON OR C_NF₂ + I₂. ← FOAMING

A solvent must dissolve soils such as oils and waxes, should be nonflammable, nontoxic, and should evaporate cleanly. The following pure agents and blends meet all these requirements:

10 [fill in]

- Toxicity is a major issue in the selection of refrigerants, foam blowing agents, and solvents. Environmental effects including ozone depletion potential and global warming potentials of halogenated hydrocarbons must be considered. The depletion of ozone in the stratosphere results in increased levels of ultraviolet radiation at the surface of the earth, causing increased incidences of skin cancer, suppression of the immune system, crop damage, and damage to aquatic organisms. These problems are considered so serious that the 1987 Montreal Protocol includes international restrictions on the productions of volatile halogenated
- 15

alkanes. Although it is easy to identify chemicals having one, two, or three selected properties, it is very difficult to identify chemicals that possess simultaneously all of the following properties: excellent fire extinguishment, cleanliness, low toxicity, short atmospheric lifetimes, low ODP, and low GWP.

- 5 Accordingly, it is the object of the present invention to provide clean, effective, nonflammable, non-toxic agents which are destroyed rapidly by natural processes in the troposphere and as a result have extremely short atmospheric lifetimes and low ozone depletion potentials and global warming potentials.

Summary of the Invention

- 10 The present invention provides tropodegradable halocarbons having all of the desired properties for use as refrigerants, foam blowing agents, and solvents. These compounds in accordance with the invention have the characteristics of cleanliness, electrical nonconductivity, low acute toxicity, non-flammability, and short atmospheric lifetimes resulting in low ODPs and GWPs. These chemicals are
- 15 of the classes of fluorinated iodoalkanes and fluorinated geminal hydrodibromides. The compounds of the present invention comprise the fluoroiodoalkanes and fluorinated geminal hydrodibromides selected from the group consisting of:
- 20 dibromofluoromethane (CHBr_2F), 2,2-dibromo-1,1,1-trifluoroethane (CHBr_2CF_3), trifluoroiodomethane (CF_3I), pentafluoroiodoethane ($\text{CF}_3\text{CF}_2\text{I}$), 1-iodoheptafluoropropane ($\text{CF}_3\text{CF}_2\text{CF}_2\text{I}$), 2-iodoheptafluoropropane ($\text{CF}_3\text{CFICF}_3$), 1-iodononafluorobutane ($\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{I}$), difluoroiodomethane (CHF_2I),

fluoriodomethane (CH_2FI), difluorodiodomethane (CF_2I_2), 1,1,2,2-tetrafluoro-1-iodoethane (CF_2ICHF_2), 1,1,2-trifluoro-1-iodoethane ($\text{CF}_2\text{ICH}_2\text{F}$), and 1-iodotridecylfluorohexane ($\text{CF}_3(\text{CF}_2)_5\text{I}$).

5 These and other aspects of the present invention will be more apparent upon consideration of the following detailed description of the invention.

Description of the Preferred Embodiment

10 Saturated haloalkanes with the appropriate physical properties (boiling point, vapor pressure, heat of vaporization, and polarity) are in most cases effective refrigerants, foam blowing agents, and solvents. However, bromine-containing haloalkanes are known to contribute to the depletion of ozone in the atmosphere, with bromine posing a greater problem than chlorine. Iodoalkanes and geminal dibromides are both destroyed rapidly by photolysis in the troposphere and do not contribute substantially to ozone depletion or global warming.

15 In accordance with the invention, the boiling points, vapor pressures, and heats of vaporization of refrigerants are also important factors in their effectiveness.

[discuss desired range of BP, vapor pressure, and heat of vaporization]

Refrigerants, foam blowing agents, and solvents must also be chemically stable during storage and use over long periods of time, and must be

unreactive with the containment systems in which they are housed. The normal temperature range experienced by a refrigerant is *** [Lance -- please fill in]. In extraordinary cases (e.g., motor burnout) higher temperatures may be experienced, but the presence of other contaminants would make replacement of the fluid
5 necessary anyway.

The ozone depletion potential of a refrigerant, foam blowing agent, or solvent is of primary importance. Currently used CFCs have high ODPs because they generate chlorine radicals in the stratosphere.

The compounds of the present invention are also selected on the basis
10 of their global warming potentials, which are increasingly being considered along with ozone depletion factors. Global warming is caused by absorption by molecules in the atmosphere of infrared radiation leaving the surface of the earth. The longer the atmospheric lifetime and the greater the infrared absorption of a molecule, the greater its GWP. It is recognized that some chlorofluorocarbons have GWPs
15 ranging up to several thousand times that of carbon dioxide.

The principal adverse short-and long-term health effects of halogenated alkanes are that they can stimulate or suppress the central nervous system, they can cause cardiac arrhythmias and can sensitize the heart to adrenaline. Inhalation of halogenated alkanes can cause bronchoconstriction, reduce pulmonary
20 compliance, depress respiratory volume, reduce mean arterial blood pressure, and

produce tachycardia. Long term effects can include hepatotoxicity, mutagenesis, teratogenesis, and carcinogenicity.

In applying the selection criteria of the invention, with regard to toxicity, each of the preferred compounds is characterized by acute toxicity (either measured or predicted) no greater than that of currently used CFCs. In this regard, toxicity is measured as LC_{50} (lethal concentration at the fifty percent level) for rats over an exposure period of 4 hours.

The compounds meeting the selected criteria are set forth in Tables II and III below.

LISTED ON P 3 & ALSO IN ATCHD
NOTES.

TABLE II. GEMINAL DIBROMIDE AGENTS.

Name	Formula	CFC No.	CAS No.	BP(°C)	Estd. GDP
dibromofluoromethane	CHBr_2F	11B2	1868-53-7	65	0.1
2,2-dibromo-1,1,1-trifluoroethane	CHBr_2CF_3	123aB2	354-30-3	73	0.1

TABLE III. FLUOROIODOCARBON AGENTS.

Name	Formula	CFC No.	CAS No.	BP(°C)
trifluoroiodomethane	CF_3I	1311	2314-97-8	-23
pentafluoroiodoethane (perfluoroethyl iodide)	$\text{CF}_3\text{CF}_2\text{I}$	11511	354-64-3	12
difluoroiodomethane	CHF_2I	2211	1493-03-4	22
1,1,2,2,3,3,3-heptafluoro-1-iodopropane (perfluoro-n-propyl iodide)	$\text{CF}_3\text{CF}_2\text{CF}_2\text{I}$	217jb11	754-34-7	41
1,1,1,3,3,3-heptafluoro-2-iodopropane (perfluoroisopropyl iodide)	$\text{CF}_3\text{CFICF}_3$	21711	677-69-0	40
fluoroiodomethane	CH_2FI	3111	373-53-5	53
difluorodiiodomethane	CF_2I_2	1212	1184-76-5	80
1,1,2,2,3,3,4,4,4-nonafluoro-1-iodobutane (perfluoro-n-butyl iodide)	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{I}$	31911	423-39-2	—
1,1,2,2-tetrafluoro-1-iodoethane	CF_2ICHF_2	124a11	3831-49-0	—
1,1,2-trifluoro-1-iodoethane	$\text{CF}_2\text{ICH}_2\text{F}$	133b11	20705-05-9	—
1-iodotridecafluorohexane (perfluoro-n-hexyl iodide)	$\text{CF}_3(\text{CF}_2)_5\text{I}$	5-1-1312	—	2.05

Examples

The following examples show the effectiveness of the agents listed as effective and environmentally safe refrigerants, foam blowing agents, and solvents.

- 1.
- 5 2.
- 3.
- 4.

The present invention has been described and illustrated with reference to certain preferred embodiments. Nevertheless, it will be understood that various
10 modifications, alterations and substitutions may be apparent to one of ordinary skill in the art, and that such modifications, alterations and substitutions may be made without departing from the essential invention. Accordingly, the present invention is defined only by the following claims.

Claims

The embodiments of the invention in which patent protection is claimed are:

1. A method of using a refrigerant comprising the steps of:
- 5 a) placing a measured quantity of refrigerant into a refrigeration system that can withstand internal pressures of up to 200 psia.
 - b) checking the pressure for correct charge
 - c) testing the system for pressure leaks
 - d) running the compressor to
- 10 where the refrigerant is a fluoroiodocarbon selected from the group consisting of: trifluoroiodomethane (CF_3I), pentafluoroiodoethane ($\text{CF}_3\text{CF}_2\text{I}$), perfluoro-n-propyl iodide ($\text{CF}_3\text{CF}_2\text{CF}_2\text{I}$), perfluoroisopropyl iodide ($\text{CF}_3\text{CF}(\text{CF}_3)\text{I}$), perfluoro-n-butyl iodide ($\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{I}$), difluoroiodomethane (CHF_2I), fluoroiodomethane (CH_2FI), difluorodiiodomethane (CF_2I_2), 1,1,2,2-tetrafluoro-1-iodoethane (CF_2ICHF_2), 1,1,2-trifluoro-1-iodoethane ($\text{CF}_2\text{ICH}_2\text{F}$), and perfluoro-n-
- 15 hexyl iodide ($\text{CF}_3(\text{CF}_2)_5\text{I}$) or a blend consisting of 5-40% by weight of one of the foregoing fluoroiodocarbons plus one or more of the following: propane, butane, isobutane, perfluoromethane, perfluoroethane, perfluoropropane, perfluorobutane.

2. A method of using a foam blowing agent comprising the steps of:

3. A method of using a solvent comprising the steps of:

a) placing a quantity of solvent onto a dispensing device such as a squirt bottle, cloth, or vapor degreaser.

5 b) checking for adequate ventilation (fume hood etc.)

c) applying the solvent to the part to be cleaned

d) removing excess solvent by air drying, wiping, or exposure to hot air knives where the solvent is a fluoroiodocarbon selected from the group consisting of: trifluoroiodomethane (CF_3I), pentafluoroiodoethane ($\text{CF}_3\text{CF}_2\text{I}$), perfluoro-n-propyl iodide ($\text{CF}_3\text{CF}_2\text{CF}_2\text{I}$), perfluoroisopropyl iodide ($\text{CF}_3\text{CF}(\text{CF}_3)\text{I}$), perfluoro-n-butyl iodide ($\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{I}$), difluoroiodomethane (CHF_2I), fluoroiodomethane (CH_2FI), difluorodiiodomethane (CF_2I_2), 1,1,2,2-tetrafluoro-1-iodoethane (CF_2ICHF_2), 1,1,2-trifluoro-1-iodoethane ($\text{CF}_2\text{ICH}_2\text{F}$), and perfluoro-n-hexyl iodide ($\text{CF}_3(\text{CF}_2)_5\text{I}$).

OR A MIX OF \nearrow + PERFLUOROCARBON
+ HYDROCARBON

Followed BY AN ALCOHOL/GLYCOL RINSE
+ AIR DRY

* RECOVER HIGH MW. IODIDE BY CONDENSATION.



Retain this for your records.

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JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: NOV 25, 1992
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT B

AT&T PAGE 1

MONTHLY SERVICE - NOV 25 THRU DEC 24

AT&T SUBTOTAL OF MONTHLY SERVICE CHARGES

8.70
\$8.70

ITEMIZED CALLS

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
1	OCT 26	10:46A	WASHINGTON DC	202 659-0074	#D	2	.48#
2	OCT 27	7:44A	ATLANTA GA	404 676-2536	#N	16	2.08#
3	OCT 27	7:44A	ATLANTA GA	404 676-2536	#D	8	1.92#
4	OCT 27	10:26A	ATLANTA GA	404 676-2677	#D	2	.48#
5	OCT 27	10:29A	ATLANTA GA	404 676-2677	#D	2	.48#
6	OCT 27	10:33A	ATLANTA GA	404 676-7755	#D	5	1.20#
7	OCT 27	7:50P	WASHINGTON DC	202 659-3859	#E	12	1.80#
8	OCT 28	2:32P	WASHINGTON DC	202 659-0074	#D	4	.96#
9	OCT 28	2:59P	ATLANTA GA	404 676-2536	#D	2	.48#
10	OCT 29	8:56A	ATLANTA GA	404 676-2536	#D	2	.48#
11	OCT 29	10:08A	ATLANTA GA	404 676-7755	#D	6	1.44#
12	OCT 29	2:53P	ATLANTA GA	404 676-2536	#D	3	.72#
13	OCT 29	3:11P	ATLANTA GA	404 676-7755	#D	4	.96#
14	OCT 29	4:41P	SACRAMENTO CA	916 643-3672	#D	19	4.37#
15	OCT 29	4:41P	SACRAMENTO CA	916 643-3672	#E	2	.30#
16	OCT 30	2:23P	ATLANTA GA	404 676-2536	#D	25	6.00#
17	NOV 03	7:34A	ATLANTA GA	404 676-2536	#N	24	3.12#
18	NOV 03	1:57P	WILMINGTON DE	302 774-5076	#D	4	.96#
19	NOV 03	2:01P	HUNTSVILLE AL	205 922-1512	#D	1	.24#
20	NOV 03	4:01P	ATLANTA GA	404 676-7755	#D	2	.48#
21	NOV 03	4:02P	ATLANTA GA	404 676-7755	#D	5	1.20#
22	NOV 03	9:28P	SO PLACER CA	916 663-1083	#E	25	3.75#
23	NOV 04	7:18A	CRANE IN	812 854-3009	#N	6	.78#
24	NOV 04	8:09A	CRANE IN	812 854-1568	#D	13	3.12#
25	NOV 04	1:18P	ATLANTA GA	404 676-7755	#D	5	1.20#
26	NOV 05	8:07A	LEAGUECITY TX	713 554-7786	#D	24	5.52#
27	NOV 05	11:45A	SACRAMENTO CA	916 643-3672	#D	16	3.68#
28	NOV 06	8:43A	NOSIOUX CY SD	605 232-2109	#D	19	4.37#
29	NOV 09	7:49A	ATLANTA GA	404 676-2536	#N	11	1.43#
30	NOV 09	7:49A	ATLANTA GA	404 676-2536	#D	17	4.08#
31	NOV 09	8:25A	KATONAH NY	914 767-6940	#D	2	.48#
32	NOV 09	5:53P	RED BANK NJ	908 747-7180	#E	2	.30#
33	NOV 09	5:58P	RED BANK NJ	908 747-7180	#E	1	.15#
34	NOV 10	1:29P	NEWBRNSWCK NJ	908 932-0220	#D	37	8.88#
35	NOV 10	2:14P	ATLANTA GA	404 676-2536	#D	23	5.52#
36	NOV 11	7:03P	EL PASO TX	915 833-4218	#E	16	2.24#
37	NOV 12	11:50A	LAKEHURST NJ	908 323-7566	#D	1	.24#
38	NOV 12	2:39P	ATLANTA GA	404 676-2536	#D	2	.48#
39	NOV 13	8:50A	ATLANTA GA	404 676-2536	#D	20	4.80#
40	NOV 13	9:13A	NEWPORT DE	302 999-2777	#D	2	.48#
41	NOV 13	9:15A	LA CROSSE WI	608 787-2251	#D	3	.72#
42	NOV 13	9:19A	TECUMSEH MI	517 423-8411	#D	2	.48#
43	NOV 13	9:51A	WILLISTON SC	803 266-5000	#D	6	1.44#
44	NOV 13	9:59A	SACRAMENTO CA	916 631-7928	#D	8	1.84#
45	NOV 13	10:08A	ATLANTA GA	404 676-2536	#D	3	.72#
46	NOV 13	5:44P	ATLANTA GA	404 676-7755	#E	1	.15#
47	NOV 13	5:45P	ATLANTA GA	404 676-7755	#E	2	.30#
48	NOV 14	7:36P	EL PASO TX	915 833-4218	#N	2	.26#
49	NOV 16	8:39A	LTL MIAMI OH	513 831-3211	#D	4	.96#
50	NOV 16	3:40P	LA CROSSE WI	608 787-3747	#D	2	.48#
51	NOV 17	8:53A	BOSTON MA	617 572-8017	#D	4	1.00#
52	NOV 17	11:14A	ATLANTA GA	404 676-2536	#D	14	3.36#
53	NOV 17	2:32P	WASHINGTON DC	202 659-0074	#D	2	.48#
54	NOV 18	8:46A	ATLANTA GA	404 676-2536	#D	9	2.16#
55	NOV 18	8:59A	NEWPORT DE	302 999-2777	#D	2	.48#
56	NOV 18	3:38P	SACRAMENTO CA	916 643-0741	#D	2	.46#

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TO PLACE AN ORDER CALL 1 800 222-0300 (NO CHARGE)



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JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: DEC 25, 1992
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT C

AT&T PAGE 2

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
57	DEC 14	9:42P	ATLANTA GA	404 676-7755	#E	18	2.70#
58	DEC 14	9:42P	ATLANTA GA	404 676-7755	#N	6	.90#
59	DEC 14	10:07P	ATLANTA GA	404 676-7755	#N	15	2.25#
60	DEC 15	7:47A	ATLANTA GA	404 676-2536	#N	2	.26#
61	DEC 15	11:47A	ATLANTA GA	404 676-7755	#D	2	.48#
62	DEC 15	12:27P	ATLANTA GA	404 676-7755	#D	2	.48#
63	DEC 15	2:42P	NEWBRNSWCK NJ	908 932-0923	#D	1	.24#
64	DEC 15	4:18P	ATLANTA GA	404 676-7755	#D	2	.48#
65	DEC 15	9:52P	NEWBRNSWCK NJ	908 932-0122	#E	8	1.20#
66	DEC 15	9:52P	NEWBRNSWCK NJ	908 932-0122	#N	10	1.50#
67	DEC 15	10:14P	EL PASO TX	915 584-2129	#N	3	.42#
68	DEC 15	10:20P	ATLANTA GA	404 676-7755	#N	4	.60#
69	DEC 16	7:42A	ATLANTA GA	404 676-7755	#N	13	1.69#
70	DEC 16	9:54A	ATLANTA GA	404 676-2536	#D	1	.24#
71	DEC 17	8:06A	ATLANTA GA	404 676-2536	#D	19	4.56#
72	DEC 17	8:33A	ATLANTA GA	404 676-7755	#D	14	3.36#
73	DEC 17	8:47A	JACKSONVL FL	904 772-2457	#D	1	.24#
74	DEC 17	8:56A	ATLANTA GA	404 676-7755	#D	1	.24#
75	DEC 17	8:58A	ATLANTA GA	404 676-7755	#D	13	3.12#
76	DEC 17	9:17A	ATLANTA GA	404 676-2536	#D	1	.24#
77	DEC 17	10:48A	ATLANTA GA	404 676-7755	#D	3	.72#
78	DEC 17	10:57A	ATLANTA GA	404 676-7755	#D	3	.72#
79	DEC 17	6:14P	ATLANTA GA	404 676-7755	#E	16	2.40#
80	DEC 17	6:31P	ATLANTA GA	404 676-7755	#E	33	4.95#
81	DEC 17	7:05P	ATLANTA GA	404 676-7755	#E	13	1.95#
82	DEC 17	7:19P	ATLANTA GA	404 676-7755	#E	3	.45#
83	DEC 17	7:23P	ATLANTA GA	404 676-7755	#E	4	.60#
84	DEC 17	8:21P	ALBANY OR	503 967-9402	#E	27	4.05#
85	DEC 18	7:48A	JACKSONVL FL	904 772-2457	#N	8	1.04#
86	DEC 18	7:55A	ATLANTA GA	404 676-2536	#N	5	.65#
87	DEC 18	7:55A	ATLANTA GA	404 676-2536	#D	17	4.08#
88	DEC 18	8:27A	ATLANTA GA	404 676-2536	#D	2	.48#
89	DEC 18	9:37A	ATLANTA GA	404 676-2536	#D	1	.24#
90	DEC 18	10:55A	SACRAMENTO CA	916 631-7928	#D	1	.23#
91	DEC 18	3:13P	BERKELEY CA	510 549-1976	#D	1	.23#
92	DEC 19	11:45A	SO PLACER CA	916 663-1083	#N	27	3.51#
93	DEC 19	12:11P	DIR ASST CA	916 555-1212		0	.65
94	DEC 21	8:31P	SO PLACER CA	916 663-1083	#E	42	5.88#
95	DEC 22	9:16P	EL PASO TX	915 833-4218	#E	13	1.82#
96	DEC 23	1:43P	FOLSOM CA	916 355-6074	#D	2	.46#
97	DEC 23	9:37P	FOLSOM CA	916 933-0494	#E	11	1.54#
						SUBTOTAL	.65

AT&T REACH OUT (SM) AMERICA CHARGE NOT INCLUDED IN SUBTOTAL
+ INTERNATIONAL DISCOUNTED CALL - CHARGES SUMMARIZED BELOW
CHARGE NOT INCLUDED IN SUBTOTAL
= IN-STATE CALL USED TO CALCULATE CREDIT

AT&T REACH OUT (SM) AMERICA CALLING PLAN SUMMARY
NIGHT/WEEKEND TIME USED 112 MINUTES
ALLOTMENT 60 MINUTES
ADDITIONAL TIME 52 MINUTES @ \$.10 / MIN 5.20
EVENING DISCOUNTED CALLS 45.90 DISCOUNT @ 25% 34.42
DAY DISCOUNTED CALLS 69.90 DISCOUNT @ 10% 62.91
AT&T REACH OUT (SM) AMERICA CALLING PLAN TOTAL 102.53

AT&T SUBTOTAL OF ITEMIZED CALLS \$103.18

NEW MEXICO GROSS RECEIPTS SURCHARGE @4.25% \$4.76



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JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: JAN 25, 1993
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT D

AT&T PAGE 1

MONTHLY SERVICE - JAN 25 THRU FEB 24

AT&T SUBTOTAL OF MONTHLY SERVICE CHARGES

8.70
\$8.70

ITEMIZED CALLS

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
1	DEC 20	6:33P	ATLANTA GA	404 676-7755	#E	15	2.25#
2	DEC 21	7:53A	ATLANTA GA	404 676-2536	#N	7	.91#
3	DEC 21	7:53A	ATLANTA GA	404 676-2536	#D	2	.48#
4	DEC 21	12:05P	ATLANTA GA	404 676-2536	#D	11	2.64#
5	DEC 22	6:41A	ATLANTA GA	404 676-2536	#N	11	1.43#
6	DEC 23	7:32A	ATLANTA GA	404 676-2536	#N	13	1.69#
7	DEC 23	2:39P	ATLANTA GA	404 676-2536	#D	2	.48#
8	DEC 24	6:29A	ATLANTA GA	404 676-2536	#N	4	.52#
9	DEC 28	10:49A	SACRAMENTO CA	916 643-3672	#D	10	2.30#
10	DEC 29	9:24A	ATLANTA GA	404 676-2536	#D	31	7.44#
11	DEC 29	12:07P	ATLANTA GA	404 676-7755	#D	16	3.84#
12	DEC 29	12:23P	ATLANTA GA	404 676-2536	#D	1	.24#
13	DEC 30	10:43A	SACRAMENTO CA	916 643-3672	#D	13	2.99#
14	DEC 31	9:21A	ATLANTA GA	404 676-2536	#D	11	2.64#
15	JAN 02	11:20A	SACRAMENTO CA	916 643-5880	#N	1	.13#
✓16	JAN 02	11:20A	SO PLACER CA	916 663-1083	#N	8	1.04#
17	JAN 03	8:37P	ATLANTA GA	404 676-2536	#E	2	.30#
18	JAN 04	8:30A	TYNDALLAFB FL	904 283-6026	#D	1	.24#
19	JAN 04	8:42A	HUNTINGTON WV	304 429-7204	#D	1	.24#
20	JAN 04	10:42A	LA CROSSE WI	608 787-2251	#D	3	.72#
21	JAN 04	10:45A	WILMINGTON DE	302 773-6887	#D	3	.72#
22	JAN 04	11:02A	ATLANTA GA	404 676-2536	#D	23	5.52#
23	JAN 04	1:26P	LA CROSSE WI	608 787-3747	#D	1	.24#
24	JAN 04	3:00P	SACRAMENTO CA	916 643-3672	#D	1	.23#
25	JAN 04	3:05P	SACRAMENTO CA	916 643-3672	#D	13	2.99#
26	JAN 04	6:38P	EL PASO TX	915 833-4218	#E	30	4.20#
27	JAN 04	7:13P	ATLANTA GA	404 676-7755	#E	4	.60#
28	JAN 04	7:18P	ATLANTA GA	404 676-7755	#E	14	2.10#
29	JAN 05	8:32A	TYNDALLAFB FL	904 283-6026	#D	33	7.92#
30	JAN 05	9:24A	SACRAMENTO CA	916 643-0741	#D	2	.46#
31	JAN 05	9:28A	SACRAMENTO CA	916 643-3672	#D	2	.46#
32	JAN 05	10:27A	ATLANTA GA	404 676-7755	#D	3	.72#
33	JAN 05	10:34A	ATLANTA GA	404 676-7755	#D	7	1.68#
✓34	JAN 05	9:04P	SO PLACER CA	916 663-1083	#E	38	5.32#
35	JAN 06	9:11A	LA CROSSE WI	608 787-3747	#D	3	.72#
36	JAN 06	9:31A	SACRAMENTO CA	916 643-1346	#D	1	.23#
37	JAN 06	9:50A	WASHINGTON DC	202 586-7760	#D	3	.72#
38	JAN 07	6:30A	ATLANTA GA	404 676-7755	#N	5	.65#
39	JAN 07	6:37A	ATLANTA GA	404 676-7755	#N	9	1.17#
40	JAN 07	6:47A	ATLANTA GA	404 676-7755	#N	6	.78#
41	JAN 07	8:55P	ATLANTA GA	404 676-7755	#E	8	1.20#
42	JAN 08	7:40A	NEWBRNSWCK NJ	908 463-5129	#N	1	.13#
43	JAN 08	7:58A	CHICAGO IL	312 984-5840	#N	2	.26#
44	JAN 08	7:58A	CHICAGO IL	312 984-5840	#D	3	.72#
45	JAN 08	9:30A	ATLANTA GA	404 676-2536	#D	41	9.84#
46	JAN 08	10:59A	NEWPORT DE	302 999-2777	#D	1	.24#
47	JAN 08	2:21P	ATLANTA GA	404 676-2536	#D	12	2.88#
48	JAN 08	2:37P	ATLANTA GA	404 676-7755	#D	1	.24#
49	JAN 08	2:39P	ATLANTA GA	404 676-7755	#D	8	1.92#
50	JAN 08	3:09P	NEWPORT DE	302 999-2777	#D	1	.24#
51	JAN 08	3:38P	ATLANTA GA	404 676-2536	#D	9	2.16#
52	JAN 08	5:45P	ATLANTA GA	404 676-2536	#E	1	.15#
✓53	JAN 09	11:26A	SO PLACER CA	916 663-1083	#N	37	4.81#
54	JAN 11	8:51A	NEWPORT DE	302 999-2777	#D	21	5.04#
55	JAN 11	9:12A	ATLANTA GA	404 676-2536	#D	7	1.68#
56	JAN 11	10:17A	ATLANTA GA	404 676-7755	#D	14	3.36#

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JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: JAN 25, 1993
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT E

AT&T PAGE 2

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
57	JAN 11	10:33A	ATLANTA GA	404 676-7755	#D	17	4.08#
58	JAN 11	12:24P	SACRAMENTO CA	916 643-3672	#D	20	4.60#
59	JAN 11	2:32P	ATLANTA GA	404 676-2536	#D	1	.24#
60	JAN 11	9:22P	ATLANTA GA	404 676-7755	#E	17	2.55#
61	JAN 11	9:39P	ATLANTA GA	404 676-7755	#E	3	.45#
62	JAN 12	9:39A	ATLANTA GA	404 676-2536	#D	4	.96#
63	JAN 12	5:24P	SACRAMENTO CA	916 643-3672	#E	16	2.24#
64	JAN 13	2:25P	ATLANTA GA	404 676-2536	#D	10	2.40#
65	JAN 13	3:17P	ATLANTA GA	404 676-2536	#D	2	.48#
66	JAN 13	9:21P	ATLANTA GA	404 676-2536	#E	3	.45#
67	JAN 14	7:12A	ATLANTA GA	404 676-2536	#N	11	1.43#
68	JAN 14	10:00A	SACRAMENTO CA	916 643-1250	#D	3	.69#
69	JAN 14	11:20A	SACRAMENTO CA	916 643-3672	#D	15	3.45#
70	JAN 14	1:48P	ATLANTA GA	404 676-2536	#D	13	3.12#
71	JAN 14	7:52P	EL PASO TX	915 833-4218	#E	1	.14#
72	JAN 15	11:19A	ARLINGTON VA	703 243-0344	#D	1	.24#
73	JAN 15	12:02P	CHICAGO IL	312 984-5800	#D	1	.24#
74	JAN 15	12:04P	DOWNERSGRV IL	708 719-4802	#D	1	.24#
75	JAN 15	12:05P	ANOKA MN	612 422-3087	#D	1	.24#
76	JAN 15	12:07P	WASHINGTON DC	202 463-6750	#D	1	.24#
77	JAN 15	12:07P	NEWPORT DE	302 999-2910	#D	2	.48#
78	JAN 15	12:09P	CRIDERSCOR PA	412 776-4841	#D	3	.72#
79	JAN 15	12:12P	FRESNO CA	209 439-1770	#D	1	.23#
80	JAN 15	2:29P	ATLANTA GA	404 676-2536	#D	8	1.92#
81	JAN 15	2:37P	MORRISTOWN NJ	201 455-3153	#D	2	.48#
82	JAN 15	2:49P	ATLANTA GA	404 676-2536	#D	2	.48#
83	JAN 15	2:50P	ARLINGTON VA	703 524-8800	#D	1	.24#
84	JAN 15	2:56P	ATLANTA GA	404 676-2536	#D	2	.48#
85	JAN 15	3:25P	CORVALLIS OR	503 752-0276	#D	5	1.20#
86	JAN 17	2:39P	EL PASO TX	915 833-4218	#N	62	8.06#
87	JAN 18	9:01A	ATLANTA GA	404 676-2536	#E	5	.75#
88	JAN 18	9:01A	ATLANTA GA	404 676-2536	E	5	.75
89	JAN 18	10:39A	ATLANTA GA	404 676-2536	#E	3	.45#
90	JAN 18	10:39A	ATLANTA GA	404 676-2536	E	3	.45
91	JAN 18	2:09P	FARMINGDL NY	516 694-9000	#E	3	.45#
92	JAN 18	2:09P	FARMINGDL NY	516 694-9000	E	3	.45
93	JAN 18	2:12P	CENTRAISLP NY	516 348-0333	#E	2	.30#
94	JAN 18	2:12P	CENTRAISLP NY	516 348-0333	E	2	.30
95	JAN 19	10:09A	SACRAMENTO CA	916 643-3672	#D	14	3.22#
96	JAN 20	1:43P	WASHINGTON DC	202 767-1716	#D	1	.24#
97	JAN 20	1:44P	WASHINGTON DC	202 767-2476	#D	1	.24#
98	JAN 20	1:46P	ST PAUL MN	612 733-5720	#D	21	5.04#
99	JAN 20	2:16P	UPLAND CA	909 987-4611	#D	5	1.15#
100	JAN 20	2:38P	QUINCY MA	617 984-7282	#D	9	2.25#
101	JAN 20	2:53P	QUINCY MA	617 984-7414	#D	1	.25#
102	JAN 20	4:03P	PARK RIDGE NJ	201 391-8484	#D	1	.24#
103	JAN 20	8:06P	SACRAMENTO CA	916 643-5880	#E	1	.14#
104	JAN 20	8:06P	SACRAMENTO CA	916 643-5880	#E	1	.14#
105	JAN 20	8:08P	SACRAMENTO CA	916 643-5880	#E	1	.14#
106	JAN 20	8:09P	SACRAMENTO CA	916 643-5880	#E	2	.28#
107	JAN 20	9:00P	EL PASO TX	915 833-4218	#E	21	2.94#
108	JAN 21	6:30A	PARK RIDGE NJ	201 391-8484	#N	3	.39#
109	JAN 21	12:52P	ATLANTA GA	404 676-2536	#D	1	.24#
SUBTOTAL						1.95	

AT&T REACH OUT (SM) AMERICA CHARGE NOT INCLUDED IN SUBTOTAL
+ INTERNATIONAL DISCOUNTED CALL - CHARGES SUMMARIZED BELOW
CHARGE NOT INCLUDED IN SUBTOTAL



Retain this page for your records.

These charges are included in the total amount due.

JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: FEB 25, 1993
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT F

AT&T PAGE 1

MONTHLY SERVICE - FEB 25 THRU MAR 24
AT&T SUBTOTAL OF MONTHLY SERVICE CHARGES

8.70
\$8.70

ITEMIZED CALLS

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
1	JAN 25	11:35A	ST PAUL MN	612 778-4805	#D	2	.48#
2	JAN 25	7:59P	LEAGUECITY TX	713 554-7786	#E	5	.70#
3	JAN 26	1:48P	FARMINGDL NY	516 694-9000	#D	3	.72#
4	JAN 26	1:51P	NEWPORT TN	615 623-4111	#D	2	.48#
5	JAN 26	1:56P	MILFORD DE	302 441-7515	#D	1	.24#
6	JAN 26	1:57P	MILFORD DE	302 441-7515	#D	1	.24#
7	JAN 27	7:41P	SACRAMENTO CA	916 643-5880	#E	1	.14#
8	JAN 29	7:44A	LEWISVILLE TX	214 462-3677	#N	1	.13#
9	JAN 29	7:54A	ST PAUL MN	612 733-5720	#N	2	.26#
10	JAN 29	10:06A	IDAHO FALLS ID	208 526-0345	#D	2	.46#
11	JAN 29	10:09A	IDAHO FALLS ID	208 526-7834	#D	1	.23#
12	JAN 29	10:19A	IDAHO FALLS ID	208 526-7834	#D	2	.46#
13	JAN 29	11:33A	MT VIEW NJ	201 628-3825	#D	2	.48#
14	JAN 29	11:35A	WILMINGTON DE	302 773-6887	#D	2	.48#
15	JAN 29	11:37A	WASHINGTON DC	202 737-1419	#D	2	.48#
16	JAN 29	11:43A	WASHINGTON DC	202 737-1419	#D	9	2.16#
17	JAN 29	11:59A	MORRISTOWN NJ	201 455-3153	#D	2	.48#
18	JAN 29	3:13P	LEWISVILLE TX	214 462-3677	#D	8	1.84#
19	JAN 29	3:34P	VAN NUYS CA	818 906-7341	#D	2	.46#
20	JAN 30	9:40A	FLS CHURCH VA	703 506-1025	#N	23	2.99#
21	JAN 30	11:24A	FLS CHURCH VA	703 506-1025	#N	54	7.02#
22	FEB 02	1:53P	WILMINGTON DE	302 886-4088	#D	18	4.32#
23	FEB 02	7:20P	EL PASO TX	915 833-4218	#E	36	5.04#
24	FEB 03	11:02A	SACRAMENTO CA	916 643-3672	#D	2	.46#
25	FEB 04	9:31A	JACKSONVL FL	904 772-2457	#D	1	.24#
26	FEB 04	10:54A	LIVERMORE CA	510 294-2530	#D	2	.46#
27	FEB 04	5:03P	SACRAMENTO CA	916 643-1250	#E	6	.84#
28	FEB 04	5:15P	SACRAMENTO CA	916 643-1250	#E	5	.70#
29	FEB 04	5:19P	SACRAMENTO CA	916 643-3672	#E	8	1.12#
30	FEB 05	9:59A	CLEVELAND OH	216 433-2249	#D	1	.24#
31	FEB 05	11:15A	BELLEVUE WA	206 635-7050	#D	4	.96#
32	FEB 05	11:48A	IDAHO FALLS ID	208 526-8096	#D	2	.46#
33	FEB 05	1:30P	CLEVELAND OH	216 433-2249	#D	1	.24#
34	FEB 05	2:04P	OAKLAND CA	510 251-2888	#D	4	.92#
35	FEB 07	10:56A	DIR ASST TX	713 555-1212	#D	0	.65
36	FEB 07	10:57A	HOUSTON TX	713 622-2412	#N	2	.26#
37	FEB 08	11:25A	OAKLAND CA	510 893-8205	#D	3	.69#
38	FEB 10	7:20A	SACRAMENTO CA	916 445-7997	#N	3	.39#
39	FEB 10	12:46P	CLEVELAND OH	216 433-2249	#D	1	.24#
40	FEB 11	2:29P	SACRAMENTO CA	916 643-3672	#D	2	.46#
41	FEB 11	2:31P	SACRAMENTO CA	916 643-0741	#D	6	1.38#
42	FEB 11	4:02P	SACRAMENTO CA	916 643-3672	#D	4	.92#
✓43	FEB 12	7:50P	SO PLACER CA	916 663-1083	#E	1	.14#
44	FEB 16	11:34A	SACRAMENTO CA	916 643-3672	#D	2	.46#
45	FEB 16	2:36P	SACRAMENTO CA	916 643-3672	#D	7	1.61#
46	FEB 16	3:53P	WASHINGTON DC	202 512-2250	#D	1	.24#
47	FEB 17	10:15A	SACRAMENTO CA	916 643-3672	#D	8	1.84#
48	FEB 20	11:11A	EL PASO TX	915 833-4218	#N	1	.13#
✓49	FEB 21	9:27P	SO PLACER CA	916 663-1083	#E	29	4.06#
50	FEB 22	7:53A	ATLANTA GA	404 676-2536	#N	1	.13#
51	FEB 22	2:40P	ATLANTA GA	404 676-7755	#D	3	.72#
52	FEB 22	2:47P	RYE NY	914 921-5100	#D	2	.48#
53	FEB 22	2:50P	BALTIMORE MD	410 547-2308	#D	4	.96#
54	FEB 22	3:05P	SACRAMENTO CA	916 631-0552	#D	11	2.53#
SUBTOTAL						.65	

FOR AT&T

BILLING INQUIRIES CALL 1 800 222-0300 (NO CHARGE)



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These charges are included in the total amount due.

JONATHAN NIMITZ
3300 MOUNTAIN RD N E
BILL DATE: MAR 25, 1993
ACCOUNT NUMBER: 505-256-1463-981R

EXHIBIT G

AT&T PAGE 1

MONTHLY SERVICE - MAR 25 THRU APR 24

AT&T SUBTOTAL OF MONTHLY SERVICE CHARGES

\$8.70

ITEMIZED CALLS

NO.	DATE	TIME	TO PLACE	TO AREA NUMBER	TYPE	MINUTES	AMOUNT
1	FEB 23	8:37P	EL PASO TX	915 833-4218	#E	39	5.46#
2	MAR 02	8:42P	EL PASO TX	915 833-4218	#E	24	3.36#
3	MAR 03	7:55A	ATLANTA GA	404 676-2536	#N	2	.26#
4	MAR 03	8:28A	QUINCY MA	617 984-7281	#D	2	.50#
5	MAR 03	10:33A	LAFAYETTE IN	317 494-2194	#D	1	.24#
6	MAR 03	10:35A	LAFAYETTE IN	317 494-2194	#D	1	.24#
7	MAR 03	11:05A	SACRAMENTO CA	916 643-5880	#D	1	.23#
8	MAR 03	11:06A	SACRAMENTO CA	916 643-5880	#D	4	.92#
9	MAR 03	11:25A	FREDERICK MD	301 695-3762	#D	2	.48#
10	MAR 03	7:43P	SO PLACER CA	916 663-1083	#E	10	1.40#
11	MAR 03	8:01P	SO PLACER CA	916 663-1083	#E	2	.28#
12	MAR 03	8:04P	SO PLACER CA	916 663-1083	#E	2	.28#
13	MAR 03	8:07P	SO PLACER CA	916 663-1083	#E	7	.98#
14	MAR 03	8:16P	SO PLACER CA	916 663-1083	#E	6	.84#
15	MAR 05	8:20A	WASHINGTON DC	202 767-2476	#D	20	4.80#
16	MAR 05	8:50A	SACRAMENTO CA	916 643-3672	#D	1	.23#
17	MAR 07	5:09P	WASHINGTON DC	202 362-3764	#E	21	3.15#
18	MAR 08	9:52A	SACRAMENTO CA	916 643-5880	#D	1	.23#
19	MAR 08	9:54A	SACRAMENTO CA	916 643-5880	#D	2	.46#
20	MAR 08	9:56A	SACRAMENTO CA	916 643-5880	#D	3	.69#
21	MAR 09	9:11A	SACRAMENTO CA	916 643-3672	#D	1	.23#
22	MAR 09	1:52P	CORVALLIS OR	503 758-0235	#D	3	.72#
23	MAR 09	2:00P	OAKLAND CA	510 251-2426	#D	7	1.61#
24	MAR 09	2:13P	CORVALLIS OR	503 758-0235	#D	7	1.68#
25	MAR 09	9:59P	SO PLACER CA	916 663-1083	#E	1	.14#
26	MAR 09	9:59P	SO PLACER CA	916 663-1083	#N	53	7.42#
27	MAR 10	9:01A	OAKLAND CA	510 893-8205	#D	4	.92#
28	MAR 10	9:07A	CORVALLIS OR	503 752-0276	#D	4	.96#
29	MAR 10	10:18A	SACRAMENTO CA	916 643-1346	#D	2	.46#
30	MAR 10	3:59P	LIVERMORE CA	510 422-1811	#D	20	4.60#
31	MAR 11	9:02A	ALEXANDRIA VA	703 308-9108	#D	6	1.44#
32	MAR 11	9:12A	TYNDALLAFB FL	904 283-6026	#D	2	.48#
33	MAR 13	12:04P	RENO NV	702 856-1933	#N	1	.13#
34	MAR 13	12:05P	RENO NV	702 856-1933	#N	3	.39#
35	MAR 13	9:34P	IDAHO FALLS ID	208 526-0835	#N	2	.26#
36	MAR 14	3:12P	SO PLACER CA	916 663-1083	#N	30	3.90#
37	MAR 15	10:38A	ATLANTA GA	404 676-2536	#D	4	.96#
38	MAR 15	11:33A	IDAHO FALLS ID	208 526-9949	#D	1	.23#
39	MAR 15	11:33A	IDAHO FALLS ID	208 526-7834	#D	2	.46#
40	MAR 15	11:42A	HARTFORD CT	203 727-7489	#D	3	.72#
41	MAR 15	12:06P	CRANE IN	812 854-3831	#D	1	.24#
42	MAR 15	12:18P	CRANE IN	812 854-3009	#D	23	5.52#
43	MAR 15	5:22P	SO PLACER CA	916 663-1083	#E	3	.42#
44	MAR 15	9:00P	SO PLACER CA	916 663-1083	#E	1	.14#
45	MAR 15	9:02P	SO PLACER CA	916 663-1083	#E	1	.14#
46	MAR 16	11:00A	ATLANTA GA	404 676-2160	#D	2	.48#
47	MAR 16	1:03P	LA CROSSE WI	608 787-2251	#D	4	.96#
48	MAR 16	1:10P	WASHINGTON DC	202 404-8101	#D	2	.48#
49	MAR 16	1:12P	WASHINGTON DC	202 404-8101	#D	2	.48#
50	MAR 16	1:28P	WASHINGTON DC	202 767-1716	#D	2	.48#
51	MAR 16	2:32P	ATLANTA GA	404 676-2160	#D	2	.48#
52	MAR 17	7:52A	TYNDALLAFB FL	904 283-6026	#N	2	.48#
53	MAR 17	8:06A	TYNDALLAFB FL	904 283-6090	#D	3	.72#
54	MAR 17	9:06A	OAKLAND CA	510 893-8205	#D	1	.23#
55	MAR 17	9:07A	OAKLAND CA	510 893-8205	#D	1	.23#
56	MAR 17	9:11A	OAKLAND CA	510 893-8205	#D	2	.46#

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

EXHIBIT H

SANTA FE OFFICE
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ALBUQUERQUE OFFICE
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201 3RD STREET NW
POST OFFICE BOX 26927
ALBUQUERQUE, NEW MEXICO 87125-6927
TELEPHONE (505) 242-9677

FEDERAL I.D. NO. 85-0262814

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
(15% PER ANNUM) ON ACCOUNTS NOT PAID BY THE LAST BUSINESS
DAY OF THE MONTH FOLLOWING THE BILLING MONTH.

MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

FEB 5 1993

Jonathan Nimitz, PhD
ETEC
3300 Mountain Road, N.E.
Albuquerque, New Mexico 87106-1920

=====

BALANCE DUE PRIOR TO THIS BILLING

\$0.00

=====

Inv #41277

RE: Patent

CLIENT/CASE NO. 41232-9301

FOR SERVICES RENDERED in the captioned matter for the period
through Jan 31 1993, to include:

1/05/93	DAP	Meeting with Jon Nimitz to review trademark rejections and discuss drafting of patent application	1.00	150	150.00
1/06/93	DAP	Telephone conference with co-inventor regarding Air Force situation and royalty-free, non-exclusive license	0.20	150	30.00
1/14/93	DAP	Review and revise claims; instructions to Dennis F. Armijo regarding Air Force agreement	1.50	150	225.00
1/14/93	DFA	Conference with Deborah A. Peacock regarding invention and agreement with Air Force; review patent and disclosure to Air Force to determine Government's rights in the invention; review disclosures to see if same invention; draft memorandum with recommendations	2.00	125	250.00
1/15/93	DAP	Revise claims and instructions to Donovan F. Duggan regarding			

7124-001

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
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FEDERAL I.D. NO. 85-0282814

STATEMENT

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MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

Jonathan Nimitz, PhD
FEB 5 1993
Page 2
Re: Patent

		remaining method claims	0.30	150	45.00
1/17/93	DFD	Drafted proposed method claim analogues.	0.60	135	81.00
1/19/93	DAP	Revise claims	0.90	150	135.00
1/20/93	DAP	Review memorandum from Dennis F. Armijo concerning Air Force; letter to client regarding Air Force and claims drafting	0.30	150	45.00
1/20/93	DFD	Revise claims	0.50	135	67.50
1/21/93	DAP	Revise claims	0.80	150	120.00
1/31/93		New Mexico Gross Receipts Tax (ALB)			66.76

SUMMARY OF HOURS:

DAP Peacock	5.00	HOURS @ \$150	750.00
DFD Duggan	1.10	HOURS @ \$135	148.50
DFA Armijo	2.00	HOURS @ \$125	250.00

TOTAL FOR PROFESSIONAL SERVICES RENDERED: \$1148.50

COSTS INCURRED:

New Mexico Gross Receipts Tax (ALB) 66.76

TOTAL EXPENSES \$66.76

TOTAL BILL: \$1215.26
PREVIOUS BALANCE: \$0.00
LESS: RETAINER \$0.00
BALANCE DUE: \$1215.26

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

SANTA FE OFFICE
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TELEPHONE (505) 982-3873

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
(15% PER ANNUM) ON ACCOUNTS NOT PAID BY THE LAST BUSINESS
DAY OF THE MONTH FOLLOWING THE BILLING MONTH.

MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

ALBUQUERQUE OFFICE
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TELEPHONE (505) 242-9677
FEDERAL I.D. NO. 85-0262814

SERVICE AND EXPENSE MAILBACK SUMMARY

===== Inv #41277

RE: Patent

CLIENT/CASE NO. 41232-9301

TOTAL FOR PROFESSIONAL SERVICES RENDERED: \$1148.50

TOTAL EXPENSES: \$66.76
=====

TOTAL BILL: \$1215.26
PREVIOUS BALANCE: \$0.00
LESS RETAINER: \$0.00

BALANCE DUE \$1215.26

=====

Please return this page with your remittance and please reference
the client/case number on all related correspondence.

AMOUNT PAID... \$ _____

SANTA FE OFFICE
323 PASEO DE PERALTA
POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307
TELEPHONE (505) 982-3873

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TELEPHONE (505) 242-9677

FEDERAL I.D. NO. 85-0262814

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
(15% PER ANNUM) ON ACCOUNTS NOT PAID BY THE LAST BUSINESS
DAY OF THE MONTH FOLLOWING THE BILLING MONTH.

MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

MAR 11 1993

Jonathan Nimitz, PhD
ETEC
3300 Mountain Road, N.E.
Albuquerque, New Mexico 87106-1920

BALANCE DUE AS OF 02/05/93
PAYMENT RECEIVED ON 02/17/93

\$1,215.26
\$1,215.26CR

BALANCE DUE PRIOR TO THIS BILLING

\$0.00

Inv #42790

RE: Patent

CLIENT/CASE NO. 41232-9301

FOR SERVICES RENDERED in the captioned matter for the period
through Feb 28 1993, to include:

2/05/93	DAP	Revise patent application	0.30	150	45.00
2/07/93	DFD	Revised patent application; proposed changes faxed to Jon Nimitz.	1.10	135	148.50
2/08/93	DAP	Finalize revisions and send to Jon Nimitz	0.20	150	30.00
2/08/93	AMT	Compute filing fees required for new patent application based on 58 claims; prepare drafts for delivery to Jon Nimitz	0.30	65	19.50
2/12/93	DFD	Telephone call to client regarding adding new claims to application. Will review same when faxed.	0.30	135	40.50
2/15/93	DAP	Review fax and telephone conference with client regarding additional claims; instructions to			

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

SANTA FE OFFICE
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POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

TELEPHONE (505) 982-3873

ALBUQUERQUE OFFICE
SUITE 1500
201 3RD STREET NW
POST OFFICE BOX 26927
ALBUQUERQUE, NEW MEXICO 87125-6927

TELEPHONE (505) 242-9677

FEDERAL I.D. NO. 85-0262814

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
(15% PER ANNUM) ON ACCOUNTS NOT PAID BY THE LAST BUSINESS
DAY OF THE MONTH FOLLOWING THE BILLING MONTH.

MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

Jonathan Nimitz, PhD
MAR 11 1993
Page 2
Re: Patent

		secretary regarding A-4 paper	0.20	150	30.00
2/17/93	DAP	Review huge number of claims; conference with Donovan F. Duggan regarding same	0.20	150	30.00
2/18/93	DFD	New application. Reviewed specification and claim format; faxed suggestions regarding limiting claims.	1.20	135	162.00
2/22/93	AMT	Telephone conference with Jonathan Nimitz regarding preparation of patent declaration and small entity claim forms; provide copies of issued UNM assigned patents	0.80	65	52.00
2/22/93	DFD	Telephone call to Jonathan Nimitz regarding pro se patent application.	0.20	135	27.00
2/24/93	DFD	Telephone call to Jon Nimitz regarding pro se patent application re citation of prior art.	0.20	135	27.00
2/26/93		Telecopy charges			2.00
2/28/93	LLW	February Docketing and paralegal services: Calculation of United States Patent & Trademark Office Filing Fees for 155 claims	0.60	55	33.00
2/28/93		New Mexico Gross Receipts Tax (ALB)			25.95

SUMMARY OF HOURS:

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

SANTA FE OFFICE
325 PASEO DE PERALTA
POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307
TELEPHONE (505) 982-3873

ALBUQUERQUE OFFICE
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POST OFFICE BOX 26927
ALBUQUERQUE, NEW MEXICO 87125-6927
TELEPHONE (505) 242-9677

FEDERAL I.D. NO. 85-0262814

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
(15% PER ANNUM) ON ACCOUNTS NOT PAID BY THE LAST BUSINESS
DAY OF THE MONTH FOLLOWING THE BILLING MONTH.

MAKE ALL REMITTANCES PAYABLE TO:
MONTGOMERY & ANDREWS, P.A.

MAIL TO: POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87504-2307

Jonathan Nimitz, PhD
MAR 11 1993
Page 3
Re: Patent

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SUMMARY OF HOURS <CONT.>

DAP Peacock	0.90	HOURS @ \$150	135.00
DFD Duggan	3.00	HOURS @ \$135	405.00
AMT Turk	1.10	HOURS @ \$65	71.50
LLW Walker	0.60	HOURS @ \$55	33.00

TOTAL FOR PROFESSIONAL SERVICES RENDERED: \$644.50

LESS CHARGES NOT BILLED: -\$200.00

TOTAL FEES: \$444.50

COSTS INCURRED:

New Mexico Gross Receipts Tax (ALB)	25.95
Telecopy charges	2.00

TOTAL EXPENSES \$27.95

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TOTAL BILL:	\$472.45
PREVIOUS BALANCE:	\$0.00
LESS: RETAINER	\$0.00
BALANCE DUE:	\$472.45

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

Patent, Trademark & Copyright Division

Deborah A. Peacock, P. E.*
Charles A. Seibert III
Donovan F. Duggan**
Rod D. Baker*
Dennis F. Armijo*
Jeffrey D. Myers*

Roberta Price, Of Counsel
Robert Downing, Of Counsel

*Registered in U.S. Patent and
Trademark Office
**Admitted Maryland Bar Only

March 11, 1993

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SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

Jonathan S. Nimitz, Ph.D.
Environmental Technology & Education Center (ETEC)
3300 Mountain Road, N.E.
Albuquerque, New Mexico 87106-1920

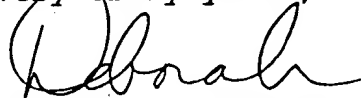
RE: Bill

Dear Jon:

Thank you for promptly paying your bill last month. Per our discussion of last month, I have requested a write-off of \$200 on the current bill (attached).

We are trying to be as efficient as possible since we know you are concerned about the money. However, the patent application grew and grew, so expect the total project cost to be somewhat higher than we quoted earlier.

Very truly yours,



Deborah A. Peacock

DAP:he
Enclosure

[DAP]nimitz3-11-93.1tr

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

EXHIBIT J

SANTA FE OFFICE
325 PASEO DE PERALTA
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TELEPHONE (505) 962-3873

STATEMENT

TERMS: PAYABLE UPON RECEIPT. LATE CHARGE OF 1 1/4% PER MONTH
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TELEPHONE (505) 242-9677

FEDERAL I.D. NO. 85-0262814

APR 16 1993

Jonathan Nimitz, PhD
ETEC
3300 Mountain Road, N.E.
Albuquerque, New Mexico 87106-1920

=====

BALANCE DUE AS OF 03/11/93	\$472.45
PAYMENT RECEIVED ON 03/17/93	\$472.45CR

BALANCE DUE PRIOR TO THIS BILLING \$0.00

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Inv #43679

RE: Patent

CLIENT/CASE NO. 41232-9301

FOR SERVICES RENDERED in the captioned matter for the period
through Mar 31 1993, to include:

3/02/93	AMT	Conference with Donovan F. Duggan and Jon Nimitz regarding submission of prior art references, timing of filing correspondence foreign applications and discussion of pending office action in U.S. trademark application for "ETEC"	0.60	65	39.00
3/02/93	DFD	Personal interview with Jon Nimitz regarding citation of prior art, foreign filing, etc.	0.70	135	94.50
3/03/93	AMT	Telephone conference with Jon Nimitz regarding proper margins for patent application and which sections should begin on separate page (claims only) and computation of filing fees for claims	0.20	65	13.00
3/04/93	AMT	Compute claims fee; telephone			

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

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FEDERAL I.D. NO. 85-0262814

Jonathan Nimitz, PhD
APR 16 1993
Page 2
Re: Patent

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		conference with Jon Nimitz and conference with Deborah A. Peacock regarding submission of prior art; prepare Information Disclosure Statement	0.70	65	45.50
3/05/93	AMT	Conference with Donovan F. Duggan and Jon Nimitz; complete filing packet, records and letter to Jon Nimitz transmitting copies of filing documents; revise Information Disclosure Statement for papers not submitted because of their bulk; docket and reminders	3.30	65	214.50
3/05/93	DFD	Pre-filing conference with Jon Nimitz and Annette Turk; reviewed and signed application before mailing	0.90	135	121.50
3/30/93		Postal charges			2.59
3/31/93	LLW	March Docketing and Paralegal Services: United States Patent & Trademark Office Early Notification of Serial No. 08/027,227	0.60	55	33.00
3/31/93		Expense Postmaster-Express Mail package sent per Deborah A. Peacock (2637)			19.95
3/31/93		New Mexico Gross Receipts Tax (ALB)			32.61

SUMMARY OF HOURS:

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

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Jonathan Nimitz, PhD
APR 16 1993
Page 3
Re: Patent

=====

SUMMARY OF HOURS <CONT.>

DFD Duggan	1.60	HOURS @ \$135	216.00
AMT Turk	4.80	HOURS @ \$65	312.00
LLW Walker	0.60	HOURS @ \$55	33.00

TOTAL FOR PROFESSIONAL SERVICES RENDERED: \$561.00

COSTS INCURRED:

New Mexico Gross Receipts Tax (ALB)	32.61
Postal charges	2.59
Expense	19.95

TOTAL EXPENSES \$55.15

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TOTAL BILL:	\$616.15
PREVIOUS BALANCE:	\$0.00
LESS: RETAINER	\$0.00
BALANCE DUE:	\$616.15